

AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

1-133. (Cancelled).

134. (New) A multi-component composite comprising (i) a basecoat deposited from a pigmented composition, and (ii) a composition applied over at least a portion of the basecoat, wherein the composition (ii) is formed from components comprising:

(a) at least one polysiloxane comprising at least one reactive functional group;

(b) at least one reactant comprising at least one functional group that is reactive with at least one functional group selected from the at least one reactive functional group of the at least one polysiloxane and at least one functional group of the at least one reactant; and

(c) a plurality of particles selected from inorganic particles, composite particles, and mixtures thereof;

wherein each component is different,

wherein the at least one reactive functional group of the at least one polysiloxane is substantially nonreactive with the particles,

wherein a retained scratch resistance value of the composition (ii) when cured is greater than a retained scratch resistance value of a multi-component composite that does not contain the plurality of particles wherein each component is different, and

wherein the composition (ii) when cured has an initial scratch resistance value such that after scratch testing greater than 40 percent of the initial 20° gloss is retained.

135. (New) A multi-component composite according to claim 134, wherein each at least one reactive functional group of the at least one polysiloxane, which may be identical or different, is selected from a hydroxyl group, a carboxyl group, an isocyanate group, a blocked polyisocyanate group, a primary amine group, a secondary amine group, an amide group, a carbamate group, a urea group, a urethane group, a vinyl

group, an unsaturated ester group, a maleimide group, a fumarate group, an anhydride group, a hydroxy alkylamide group, and an epoxy group.

136. (New) A multi-component composite according to claim 134, wherein the at least one polysiloxane comprises at least two reactive functional groups.

137. (New) A multi-component composite according to claim 134, wherein each at least one reactive functional group of the at least one polysiloxane, which may be identical or different, comprises at least one reactive functional group selected from a hydroxyl group, a carbamate group, an epoxy group, a carboxyl group, and a carbamate group.

138. (New) A multi-component composite according to claim 137, wherein each at least one reactive functional group of the at least one polysiloxane, which may be identical or different, comprises at least two reactive functional groups selected from a hydroxyl group, and a carbamate group.

139. (New) A multi-component composite according to claim 137, wherein each at least one reactive functional group of the at least one polysiloxane, which may be identical or different, comprises an oxyalkylene group and at least two hydroxyl groups.

140. (New) A multi-component composite according to claim 134, wherein the at least one polysiloxane, when added to the other components of the composition, is present in the composition in an amount ranging from 0.01 to 90 weight percent based on total weight of the resin solids of the components which form the composition.

141. (New) A multi-component composite according to claim 140, wherein the at least one polysiloxane is present in an amount of at least 2 weight percent.

142. (New) A multi-component composite according to claim 141, wherein the at least one polysiloxane is present in an amount of at least 5 weight percent.

143. (New) A multi-component composite according to claim 142, wherein the at least one polysiloxane is present in an amount of at least 10 weight percent.

144. (New) A multi-component composite according to claim 134, wherein the particles are selected from fumed silica, amorphous silica, colloidal silica, alumina, colloidal alumina, titanium oxide, cesium oxide, yttrium oxide, colloidal yttria, zirconia, colloidal zirconia and mixtures of any of the foregoing.

145. (New) A multi-component composite according to claim 134, wherein the particles are surface treated.

146. (New) A multi-component composite according to claim 134, wherein the particles include colloidal silica.

147. (New) A multi-component composite according to claim 134, wherein the particles have an average particle size less than 100 microns prior to incorporation into the composition.

148. (New) A multi-component composite according to claim 134, wherein the particles have an average particle size less than 50 microns prior to incorporation into the composition.

149. (New) A multi-component composite according to claim 134, wherein the particles have an average particle size ranging from 1 to less than 1000 nanometers prior to incorporation into the composition.

150. (New) A multi-component composite according to claim 149, wherein the particles have an average particle size ranging from 1 to 100 nanometers prior to incorporation into the composition.

151. (New) A multi-component composite according to claim 150, wherein the particles have an average particle size ranging from 5 to 50 nanometers prior to incorporation into the composition.

152. (New) A multi-component composite according to claim 134, wherein the particles, when added to the other components that form the composition, are present in the composition in an amount ranging from 0.01 to 75 weight percent based on total weight of the resin solids of the components which form the composition.

153. (New) A multi-component composite according to claim 152, wherein the particles are present in an amount of at least 0.1 weight percent.

154. (New) A multi-component composite according to claim 152, wherein the particles are present in an amount of at least 0.5 weight percent.

155. (New) A multi-component composite according to claim 152, wherein the particles are present in an amount of less than 20 weight percent.

156. (New) A multi-component composite according to claim 152, wherein the particles are present in an amount of less than 10 weight percent.

157. (New) A multi-component composite according to claim 134, wherein the at least one reactant is selected from at least one curing agent.

158. (New) A multi-component composite according to claim 157, wherein the at least one curing agent is selected from an aminoplast resin, a polyisocyanate, a blocked polyisocyanate, a polyepoxide, a polyacid, and a polyol.

159. (New) A multi-component composite according to claim 157, wherein the at least one curing agent is selected from an aminoplast resin, and a polyisocyanate.

160. (New) A multi-component composite according to claim 157, wherein the curing agent, when added to the other components that form the composition, is present in an amount ranging from 1 weight percent to 65 weight percent based on total weight of the resin solids of the components which form the composition.

161. (New) A multi-component composite according to claim 160, wherein the curing agent is present in an amount of at least 5 weight percent.

162. (New) A multi-component composite according to claim 161, wherein the curing agent is present in an amount of at least 10 weight percent.

163. (New) A multi-component composite according to claim 134, wherein the components which form the composition comprise at least one film-forming material different from (a).

164. (New) A multi-component composite according to claim 163, wherein the at least one film-forming material is selected from at least one additional polymer, in addition to and different from said at least one polysiloxane, comprising at least one reactive functional group.

165. (New) A multi-component composite according to claim 164, wherein the at least one reactive functional group of the at least one polymer is selected from a hydroxyl group, a carboxyl group, an isocyanate group, a blocked polyisocyanate group, a primary amine group, a secondary amine group, an amide group, a carbamate group, a urea group, a urethane group, a vinyl group, an unsaturated ester group, a maleimide group, a fumarate group, an anhydride group, a hydroxy alkylamide group, and an epoxy group.

166. (New) A multi-component composite according to claim 165, wherein the at least one reactive functional group of the at least one polymer is selected from a hydroxyl group, and a carbamate group.

167. (New) A multi-component composite according to claim 134, wherein the components which form the composition comprise at least one catalyst.

168. (New) A multi-component composite according to claim 167, wherein the at least one catalyst is present in an amount sufficient to accelerate the reaction between the at least one functional group of the at least one reactant and the at least one reactive functional group of the at least one polysiloxane.

169. (New) A multi-component composite according to claim 167, wherein the at least one catalyst is an acid catalyst.

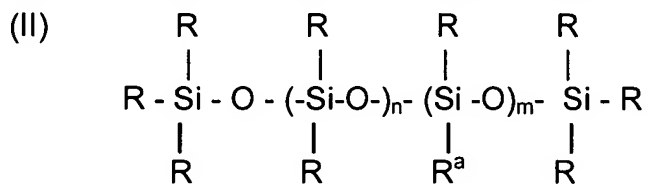
170. (New) A multi-component composite according to claim 169, wherein the at least one catalyst is selected from an acid phosphate, a substituted sulfonic acid and an unsubstituted sulfonic acid.

171. (New) A multi-component composite according to claim 167, wherein the at least one catalyst is phenyl acid phosphate.

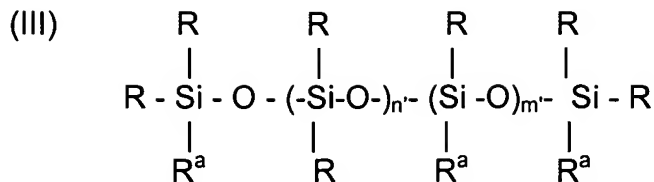
172. (New) A multi-component composite according to claim 134, wherein the components which form the composition comprise at least one surface active agent.

173. (New) A multi-component composite according to claim 172, wherein the at least one surface active agent is selected from an anionic surface active agent, a nonionic surface active agent and a cationic surface active agent.

174. (New) A multi-component composite according to claim 134, wherein the at least one polysiloxane has the following structure (II) or (III):



or



wherein:

m has a value of at least 1; m' ranges from 0 to 75; n ranges from 0 to 75; n' ranges from 0 to 75; each R, which may be identical or different, is selected from H, OH, monovalent hydrocarbon groups, monovalent siloxane groups, and mixtures of any of the foregoing; and

each R^a, which may be identical or different, comprises the following structure (IV):



wherein each R³, which may be identical or different, is selected from an alkylene group, an oxyalkylene group, an alkylene aryl group, an alkenylene group, an oxyalkenylene group, and an alkenylene aryl group; and

each X, which may be identical or different, represents a group which comprises at least one reactive functional group selected from a hydroxyl group, a carboxyl group, an isocyanate group, a blocked polyisocyanate group, a primary amine group, a secondary amine group, an amide group, a carbamate group, a urea group, a urethane group, a vinyl group, an unsaturated ester group, a maleimide group, a fumarate group, an anhydride group, a hydroxy alkylamide group, and an epoxy group.

175. (New) A multi-component composite according to claim 174, wherein (n + m) ranges from 2 to 9.

176. (New) A multi-component composite according to claim 174, wherein (n' + m') ranges from 2 to 9.

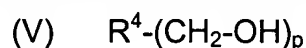
177. (New) A multi-component composite according to claim 175, wherein (n + m) ranges from 2 to 3.

178. (New) A multi-component composite according to claim 176, wherein (n' + m') ranges from 2 to 3.

179. (New) A multi-component composite according to claim 174, wherein each X, which may be identical or different, represents a group comprising at least one reactive functional group selected from a hydroxyl group and a carbamate group.

180. (New) A multi-component composite according to claim 174, wherein each X, which may be identical or different, represents a group comprising at least two hydroxyl groups.

181. (New) A multi-component composite according to claim 174, wherein X represents a group comprising at least one substituent selected from H, a monohydroxy-substituted group and a group having the following structure (V):



wherein R^4 is $-CH_2-\overset{\overset{|}{\text{C}}}{\text{C}}-R^3$ when p is 2 and R^3 is C_1 to C_4 alkyl, or

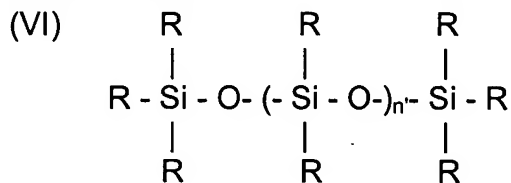
R^4 is $-CH_2-\overset{\overset{|}{\text{C}}}{\text{C}}-$ when p is 3,

wherein a portion of X is a group having the structure (V).

182. (New) A multi-component composite according to claim 181, wherein m is 2 and p is 2.

183. (New) A multi-component composite according to claim 134, wherein the polysiloxane (a) is the reaction product of at least the following reactants:

(i) at least one polysiloxane of the formula (VI):



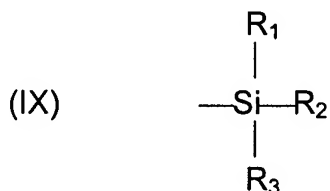
wherein each substituent group R, which may be identical or different, represents a group selected from H, OH, a monovalent hydrocarbon group, a siloxane group, and mixtures of any of the foregoing; at least one of the groups represented by R is H, and n' ranges from 0 to 100, such that the percent of Si-H content of the polysiloxane of formula (VI) ranges from 2 to 50; and

(ii) at least one molecule which comprises at least one functional group selected from a hydroxyl group, a carboxyl group, an isocyanate group, a blocked polyisocyanate group, a primary amine group, a secondary amine group, an amide group, a carbamate group, a urea group, a urethane group, a vinyl group, an unsaturated ester group, a maleimide group, a fumarate group, an anhydride group, a hydroxy alkylamide group, and an epoxy group and at least one unsaturated bond capable of undergoing a hydrosilylation reaction.

184. (New) A multi-component composite according to claim 183, wherein said at least one functional group is selected from hydroxyl groups.

185. (New) A multi-component composite according to claim 134, wherein the components from which the composition is formed comprise at least one material which has at least one reactive functional group which is blocked with a silyl group.

186. (New) A multi-component composite according to claim 185, wherein the silyl blocking group has the following structure (IX):



wherein each R_1 , R_2 and R_3 , which may be identical or different, is selected from hydrogen, an alkyl group comprising from 1 to 18 carbon atoms, a phenyl group, and an allyl group.

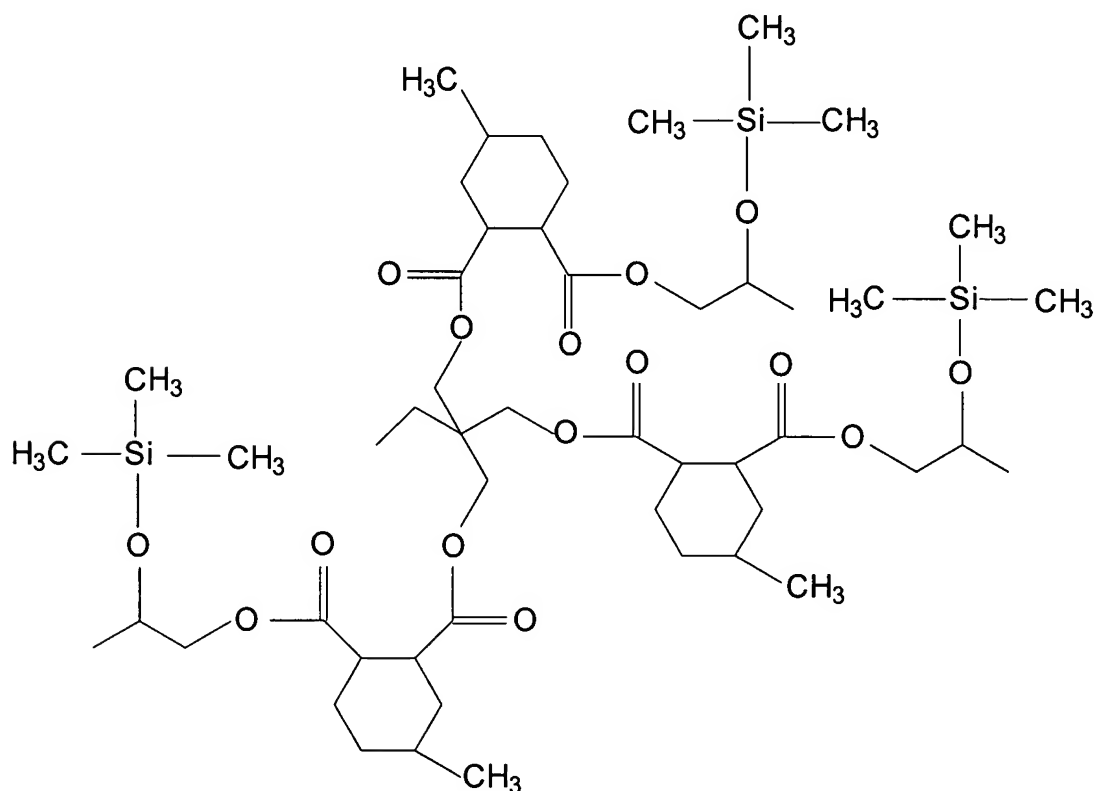
187. (New) A multi-component composite according to claim 185, wherein the at least one reactive functional group is selected from a hydroxyl group and a carboxyl group.

188. (New) A multi-component composite according to claim 185 comprising at least one compound which can be reacted with the functional group to form the silyl group, wherein the at least one compound is selected from hexamethyldisilazane, trimethylchlorosilane, trimethylsilyldiethylamine, t-butyl dimethylsilyl chloride, diphenyl methylsilyl chloride, hexamethyl disilylazide, hexamethyl disiloxane, trimethylsilyl triflate, hexamethyldisilyl acetamide and mixtures of any of the foregoing.

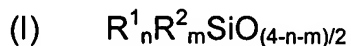
189. (New) A multi-component composite according to claim 185, wherein the at least one material comprises at least one linkage selected from an ester linkage, an urethane linkage, a urea linkage, an amide linkage, a siloxane linkage and an ether linkage.

190. (New) A multi-component composite according to claim 185, wherein the at least one material comprises a reaction product having the following structure structure (X):

(X)



191. (New) A multi-component composite according to claim 134, wherein the at least one polysiloxane has at least one of the following structural units (I):



wherein each R¹, which may be identical or different, represents H, OH, or a monovalent hydrocarbon group; each R², which may be identical or different, represents a group comprising at least one reactive functional group; wherein m and n fulfill the requirements of 0 < n < 4, 0 < m < 4 and 2 ≤ (m+n) < 4.

192. (New) A multi-component composite according to claim 191, wherein each R^2 represents a group comprising at least one reactive functional group selected from a hydroxyl group, a carboxyl group, an isocyanate group, a blocked polyisocyanate group, a primary amine group, a secondary amine group, an amide group, a carbamate group, a urea group, a urethane group, a vinyl group, an unsaturated ester group, a maleimide group, a fumarate group, an anhydride group, a hydroxy alkylamide group, and an epoxy group.

193. (New) A multi-component composite according to claim 192, wherein R^2 represents a group comprising at least one reactive functional group selected from a hydroxyl group, a carbamate group, a carboxyl group, and an epoxy group.

194. (New) A multi-component composite according to claim 134, wherein the particles are present in an amount of at least 5 weight percent.

195. (New) A multi-component composite according to claim 134, wherein the composition (ii) when cured has an initial scratch resistance value such that after scratch testing greater than 50 percent of the initial 20° gloss is retained.

196. (New) A multi-component composite according to claim 134, wherein the composition (ii) when cured has a retained scratch resistance value such that after scratch testing greater than 30 percent of the initial 20° gloss is retained.

197. (New) A multi-component composite according to claim 196, wherein the composition (ii) when cured has a retained scratch resistance value such that after scratch testing greater than 40 percent of the initial 20° gloss is retained.

198. (New) A multi-component composite according to claim 134, wherein the composition (ii) when cured has a concentration of particles within a surface region thereof which is greater than a concentration of particles within a bulk region thereof.

199. (New) A multi-component composite according to claim 134, wherein cured composition (ii) is a topcoat.

200. (New) A multi-component composite according to claim 134, wherein cured composition (ii) is transparent.

201. (New) A method for making a multi-component composite comprising:

- (a) applying a pigmented composition to a substrate to form a basecoat (i);
- (b) applying a composition (ii) over at least a portion of the basecoat (i); and

(c) curing the composition (ii) to form a cured composition;

wherein the composition (ii) is formed from components comprising:

(I) at least one polysiloxane comprising at least one reactive functional group;

(II) at least one reactant comprising at least one functional group that is reactive with at least one functional group selected from the at least one reactive functional group of the at least one polysiloxane and at least one functional group of the at least one reactant; and

(III) a plurality of particles selected from inorganic particles, composite particles, and mixtures thereof;

wherein each component is different,

wherein the at least one reactive functional group of the at least one polysiloxane is substantially nonreactive with the particles,

wherein a retained scratch resistance value of the multi-component when cured is greater than a retained scratch resistance value of a multi-component composite that does not contain the plurality of particles wherein each component is different, and

wherein the composition (ii) when cured has an initial scratch resistance value such that after scratch testing greater than 40 percent of the initial 20° gloss is retained.

202. (New) A method according to claim 201, wherein the composition (ii) is thermally cured after application to the substrate.

203. (New) A method according to claim 201, wherein the composition (ii) is cured by exposure to ionizing radiation after application to the substrate.

204. (New) A method according to claim 201, wherein the composition (ii) is cured by exposure to actinic radiation after application to the substrate.

205. (New) A method according to claim 201, wherein the composition (ii) is cured by exposure to (1) ionizing radiation or actinic radiation and (2) thermal energy after application to the substrate.